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ABSTRACT

An outdoor education workshop, initiated at the request of teachers in the Bear Creek Watershed area (Alabama), was conducted through a cooperative effort of local agencies and offices of the Tennessee Valley Authority. The purpose of the workshop was to demonstrate to the teachers how the outdocrs can be utilized to introduce, strengthen, and emphasize concepts of the school curriculum. Methods and techniques for teaching in the out-cf-doors were identified for the following curriculum areas: science, language arts, social studies, creative arts, and mathematics. Lesson plans, developed by the teachers during the workshop and related to the above curriculum areas are compiled in this booklet. In general they specify: subject category, contributor's name, title of activity, grade level, major concept, purpose and objectives, materials required, procedures to follow, vocabulary words, related activities, resources, and evaluation. Lists of resource personnel and participants, the workshop schedule, and a reference list of books, pamphlets, and films supplement the lesson plans. (BL)

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BEAR CREEK, ALABAMA - TEACHERS' WORKSHOP IN ENVIRONMENTAL EDUCATION

Hodges, Alabama
June 14-18, 1971

SE 016 140

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BEAR CREEK WORKSHOP

The week of June 14-18, 1971, a regional teacher's workshop was held at the Bear Creek Reservoir in Franklin County, Alabama. The workshop was initiated at the request of teachers of the Bear Creek Watershed area who had visited the Conservation Education Center at Land Between the Lakes, Kentucky, and/or participated in an outdoor education project in the Bear Creek area November 1970. The workshop was then planned and carried out in a cooperative effort involving the Bear Creek Watershed Association, the Bear Creek Development Authority, the area school systems; and TVA's Office of Tributary Area Development, Education and Manpower Development Branch, and the Conservation Education Section, Land Between the Lakes.

Seventeen teachers representing 10 school systems attended the workshop; some commuting more than 100 miles a day to and from the workshop site. There was no registration fee charged and no university credit was given for attendance.

The purpose of the workshop was to demonstrate to the teachers how the outdoors can be utilized to introduce, strengthen, and emphasize concepts of the school curriculum. Methods and techniques for teaching in the out-of-doors were identified for the following curriculum areas: science, language arts, social studies, creative arts, and mathematics. In addition, speakers representing various agencies were utilized as resource people and assisted the teachers in actualizing the concepts of outdoor education.

Following 4 days of instruction, the final day of the workshop was scheduled for the presentation of lesson plans developed by the participants. Copies of these lesson plans are included in this report.

RESOURCE PERSONNEL

John Thurman, TVA, Division of Forestry, Fisheries and Wildlife Development, Fisheries and Waterfowl Resources Branch.

George Gibbons, Florence State University, Florence, Alabama.

Richard Urban, TVA, Division of Environmental Research and Development, Environmental Biology Branch.

Herbert Jones, TVA, Division of Environmental Research and Development, Environmental Biology Branch.

Richard Vance, National Park Service, Natchez Trace Parkway.

Bill Parsons, State Department of Conservation, Alabama.

Wayne Flippo, State Department of Conservation, Alabama.

Earl Norton, Soil Conservation Service, Alabama.

J. A. Ritchey, Soil Conservation Service, Alabama.

Mable Robinson, Consultant, Health, Physical Education and Recreation, Alabama, State Department of Education.

John Paulk, Supervisor, Conservation Education Section, TVA, Land Between the Lakes.

Larry Contri, Conservationist (Resource Education), Conservation Education Section, TVA, Land Between the Lakes.

Ann Winstead, Conservationist (Resource Education), Conservation Education Section, TVA, Land Between the Lakes.

Jere Farley, TVA, Division of Personnel.

Frank Moses, TVA, Office of Tributary Area Development.

Don Sibley, Administrator, Bear Creek Development Authority.

Ernest Wright, Bear Creek Watershed Association.

PARTICIPANTS

Peggy Adair Guin, Alabama	Marion County High School	8-9 Science
Alma Barber 1211 20th Street Haleyville, Alabama	Haleyville Jr. High School	Jr. & Sr. High Spec, Education
Sandra Burleson Winfield, Alabama	Winfield City School	2nd Grade
Marguerite Butler Box 433 Guin, Alabama	Winfield City High School	Sr. High Spec. Education
Thomas G. Butler Box 433 Guin, Alabama	Marion Co. School	8-12 Vocational Agriculture
Frances M. Cook Route 3, Box 41 Tuscumbia, Alabama	Southside Elementary	1-2 Grades & Principal
Sylvia C. Glenn Route 1 Hodges, Alabama	Belqueen School	7-12 Physical Education
Mabel Kennedy Route 1, Box 36 Red Bay, Alabama	Red Bay School	3rd Grade
Carrye S. Martin Box 93 Haleyville, Alabama	Winston County School	4th Grade
Elizabeth Owen 704 Meelie Avenue Muscle Shoals, Alabama	Avalon Middle School	6th Grade
Bryce W. Tidmore 1111 Berenice Street Tuscumbia, Alabama	New Bethel	Upper Elementary & Jr. High

PARTICIPANTS (continued)

Jo Ann Tidwell	Marion County High School	7-8 English & Guidance Counselor
J. A. Timmerman Route 7	Russellville City System	Sr. High Spec. Education
Gene Vance Wilson Lake Shores Muscle Shoals, Alabama	Avalon Middle School	6th Grade
Laura J. Wright 3407 Pine Circle Sheffield, Alabama	Blake School	5th Grade

BEAR CREEK, ALABAMA TEACHER'S WORKSHOP

ENVIRONMENTAL EDUCATION

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8:30 (ALL) Workshop Orientation Intro. to resource materials L. Contri A. Winstead (A) Basic Ecology J. Thurman (B) Basic Ecology J. Thurman (C) Workshop Orientation Intro. to resource materials J. Faulk A. Winstead L. Contri	8:30 (A) Creative Arts G. Gibbons (B) Water Quality R. Urban (C) Air Quality H. Jones 9:45 (C) Water Quality R. Urban (B) Air Quality H. Jones	8:30 - National Park Service R. Vance 9:30 (A) Social Studies A. Winstead (B) Language Arts L. Contri (C) Science J. Faulk	8:30 - Soil Conservation Service J. Richey 9:30 (A) Program Planning A. Winstead (B) Science L. Contri (C) Mathematics J. Faulk	8:30 Field Teaching J. Faulk L. Contri A. Winstead
12:00 Lunch (Rock Bridge Canyon)	12:00 Lunch	12:00 Lunch	12:00 Lunch	12:00 Lunch
1:00 Rock Bridge Canyon (A) Science J. Faulk (B) Mathematics A. Winstead (C) Language Arts L. Contri	1:00 (B) Creative Arts G. Gibbons (A) Water Quality R. Urban (C) Air Quality H. Jones	1:00 - Alabama Department of Conservation C. Parsons W. Filippo 2:00 (A) Mathematics J. Faulk (B) Social Studies A. Winstead (C) Program Planning L. Contri	1:00 - Department of Education State of Alabama M. Robinson 2:00 (A) Language Arts L. Contri (B) Program Planning J. Faulk (C) Social Studies A. Winstead 5:30 - Cookout	1:00 - Field Teaching J. Faulk L. Contri A. Winstead 3:00 - Evaluations

LESSON PLANS

Basic Lesson plan form (Not all parts will be used in every lesson plan)

Category: example - Language Arts

Contributor:

Title of Project

Grade level:

Concept:

Purpose:

Behavioral Objectives - 1.
2.
3

Materials:

Procedure:

Introducing the concept -

Developing the concept -

Ending the concept -

Related Activities:

Resources:

Evaluation:

Category: Arts and Crafts

Contributor: Alma Barber

Grasses

Purpose: To develop an appreciation of grass as a medium of art expression.

Materials: Grasses
Glue
Burlap or cardboard
Tweezers
Scissors

Procedure: In previous lessons we have discussed the value of grass as a food, its contribution to the food chain, and its use as an aid in controlling erosion. Today we will show how grass can be used as a medium of self-expression.

Out in the field students will collect a variety of grasses. We discuss the common names which will help the students realize that there are different varieties of grasses.

Back in the classroom each student creates his own arrangement of weeds, seeds, and grasses

Category: Arts and Crafts

Contributors: [illegible]

Ink Painting with Soot

Purpose: To develop a painting technique using natural materials.

Materials: Soot, glue (mucilage), paper, large water jar, paint brush, mussle shells or old bowls for grinding, small container.

Vocabulary: Sumi ink - ink made from soot. Soot from wood produces brown tones, soot from oil produces blue black tones.)

Procedure: Gather soot from fireplace or oil burning stove. By using muscle shell and smooth rock grind soot into powder form and mix with 1/3 glue. Let dry overnight in small container. Chip out amount of ink needed and grind again. Mix with water; the thicker the mixture the darker the color. Apply with paint brush to paper. Place brush level with paper press down, pull across and raise brush to a point as you end the stroke.

Program: Arts and Crafts

Contributor: Jane Ware

Drying Flowers with Borax

Objective: To provide an art activity using natural materials in the hand.

Materials: Borax and boxes

Procedure: Gather small flowers, leaves and grasses. Lie these flowers in small accounts and hang up side down for about 2-4 days. Then place materials up side down in some box containing borax. These pressed flowers can be mounted on paper and displayed

Category: Arts and Crafts

Author: Alma Barber

Art

Concept: Art consists of space, shape, color and texture.

Purpose: To give the child an opportunity to explore and appreciate his natural surroundings; to encourage the use of imagination in expressing himself in the realistic portraying that which is observed.

Materials: Rubber cement or glue
Paper or board
Scissors
Materials gathered on field trip

Vocabulary: Collage
Design
Smooth
Shape
Space
Texture

Procedure: Make an original work of art using objects that illustrate texture, shape, color and space. Make collages.

Final Result: Displays

Category: Arts and Crafts

Fire Building and Fire Safety (continued)

e. Stir and resprinkle.
f. Do not stop until all ashes feel cool to the hands.
g. Cover with rocks or dirt.

Fire Safety Procedures:
1. Use fire places to keep fires under control.
2. Build small fires.
3. If windy, build a fire in a ditch.
4. Do not play with the fire.
5. Clear the ground around the fire and the branches above it.
6. Never leave a fire without someone to watch it.
7. Always have sand, water, and shovel handy.
8. Always break a match in two after it is cold to the touch if it is being thrown away.

Related Activities: Topics on fire building and fire safety can be discussed to advantage in the classroom previous to the camping experience. The forest ranger may talk to the group and show documentary films or slides.

Category: Language Arts

Contributor: Jo Ann Tidwell

Language Skills in the Outdoors

Purpose: To teach use of descriptive and specific adjectives before a noun or after a linking verb by using objects in nature and by describing them.

Materials: charts, bags, dictionary, Thesaurus, nature objects

Procedure:

1. Introduction to adjectives by use of a flip chart.
2. The process of using an adjective to describe a nature object is explained.
   a. One adjective is given before the noun.
   b. One adjective is given after a noun
   c. Compound or co-ordinate adjectives are used before a noun.
3. The students go outdoors, find one nature object and place in his bag (without showing anyone else what the object is).
4. When each student has collected one object each, he uses four adjectives to describe his nature object. A thesaurus or dictionary may be used.
5. Using these adjectives each class member will attempt to identify the nature object by writing the "guess" on paper.
6. When each student has had a turn describing and a guess has been made for each object, the bags are opened and the nature object is shown.

Category: Language Arts

Contributor: Elizabeth Owen

Descriptive Word Game

Purpose: To develop one's vocabulary

Procedure: (No equipment is necessary). Gather in an outdoor area. A student will be picked to call out a nature object. He will then call on another student who must list three adjectives about that object. These adjectives must begin with the first letter of the object named. (For example, the object is grass - green, grand, great.) The student called on is timed. He is allowed 10 seconds to give his three adjectives. If he can't do it, the caller gets to call again. If the one called on can answer in time, he becomes the caller.

Category: Language Arts

Contributor: Laura Jane Wright

The Alphabet Scavenger Hunt

Purpose: To recognize and identify certain items of nature, to place in alphabetical order, and to operate as a team.

Procedure:
1. Divide group into teams.
2. Each team is given a sack for collection.
3. Each team is given the following list.
4. After a specified time each team is to return and put items in alphabetical order.

Find things of nature beginning with letters of the alphabet.
List might include such things as:

A - acorn, ant, apple leaf
B - bug, bark, bee
C - cricket, clay, conglomerate
D - driftwood, dog hair, dogwood
E - evergreen, earthworm
F - frog, fur, fish, fern
G - grasshopper, grass, granite
H - hackberry, hemlock leaf, hornet
I - insect, igneous rock
J - jaybird feather, jack-in-the- pulpit
K - kindling
L - lichen, leaf, lily
M - mushroom, moss, mint
N - nest, nut
O - oatgrass, onion
P - poke, poison ivy, pebble
Q - Queen Anne's lace
R - root, rod (stick)
S - slate, snake skin, shale
T - thorn, tent caterpillar
U - underbrush
V - vine, volcanic rock, violet
W - walnut, web, wasp
X - X-mas tree twig
Y - young caterpillar, yellow flower, yucca
Z - zinc-colored rock

Category: Language Arts

Contributor: J. A. Timmerman

Operation Daywatch

Purpose: Observation - use of the senses. Following this exercise, the student should be able to:

1. Tell the temperature, wind direction, cloud cover and whether it is clear or cloudy.
2. Distinguish the plants, the colors, and the odors that surround him.
3. Separate natural from man-made sounds.

Materials: Thermometer, compass, pencil and pad.

Procedure:

1. The weather -
   a. What is the temperature?
   b. In which direction does the wind blow?
   c. Is the wind light, moderate, strong?
   d. Is there fog or dew?
   e. Is it clear or cloudy?
   f. Is it raining? Snowing?
2. The sky -
   a. What can you see in the sky?
   b. Is the sun high or low?
   c. What colors can you see in the sky?
3. The earth -
   a. What can you see?
   b. What can you smell?
   c. How does the ground around you feel?
   d. How far can you see?
   e. What living creatures can you see?
4. Sounds -
   a. Describe the sounds that you hear.
   b. What do you think causes these sounds?
   c. Can you hear sounds caused by humans?
   d. What are these human-made sounds?
5. Yourself -
   a. How do you feel?
   b. What are you thinking about?
   c. At this point, what would you like to do?

Category: Nature Games

Games in the Out-of-Doors

Purpose:
1. To develop an appreciation of the out-of-doors through games.
2. To develop an appreciation of our natural environment as a learning environment.
3. To develop skills utilizing the student's ability to see, hear, feel, smell and taste.

Activities: Shadow Plays - Stretch a curtain (it works better if it is wet) tightly and place bright lights far enough behind it to leave a miniature stage just behind the curtain. Turn out all the other lights. Actors performing their skit, story, ballad, or burlesque should be as close to the sheet as possible so that their silhouettes will be sharp and clear. Only a suggestion of costume is necessary, and settings and props can be cut from cardboard or old packing boxes and glued together. The audience is given only a brief description of the situation or the whole script is read as it is acted out accompanied by "mood music" if preferred.

Map Hike - Use a compass and map and collect notes for use in constructing a trail map or try to follow a trail map someone else has constructed.

Bee Line or Crow Hike - Follow a compass bearing as closely as possible to see what interesting scenery you encounter on the way.

Nature, Treasure or Scavenger Hunt - Give each group, persons, or pair a list of nature objects to bring in, such as leaves or certain trees, common flowers, certain kinds of rocks, and so forth. The first back with the correct and complete list wins. Some of the items should be easy to find, others hard. Avoid poor conservation practices by not tramping over and collecting items which should be conserved.

Hold the Front - The participants draw for places and assume that order in single file. The object is to get and maintain the position at the front of the line. The leader asks the person in the 1st position to identify a nature object seen along the way. If he does it correctly he holds his position, if not those behind him are given a chance in turn to identify it. The one who finally does so moves up to the front of the line. The leader then asks a new question of the person just behind the one who answered correctly. If he misses, those behind him have a similar chance to advance to his place in line. The person at the front of the line, after everyone else fails to correctly name the object, wins.

Category: Nature Games

Contributor: Elizabeth Owen

Mystery Bag

Purpose: To develop a student's senses other than sight. To help him realize he can "see" objects without using his eyes. To encourage the student to express his feelings.

Materials: Paper bags, pencils, paper

Procedure: Number the bags (one for each child). Instruct the students to go out and gather one nature object and place in his bag (he is not to let anyone see this object). Return to the group and sit down in a circle. Have each student write down a consecutive number for his bag. Then have them pass the bags around the circle. Each student inspects the bags passed to him by touch, taste, smell or hearing, but not by sight. Have them write down what they think is in each bag. Be sure they write their description on paper to correspond with the same numbered bag. After all bags are inspected, have each child call out what he thinks the objects are, and the one with the most correct answers wins the game.

As a follow-up activity, the teacher will remove the objects from the bags. She will then instruct the students to write down how they believed each object smelled, tasted, felt, or sounded. These descriptions can then be shared among the group.

Category: Science

Contributor: Peggy Adair

Living Things and Their Environment

Purpose:
1. To help the students realize the interrelationship between all living things and their environment.
2. To make students aware of the influence of man on his environment.

Activities and Procedure:

1. Use display chart, "The Pyramid of Life." Six basic groups of the living community include:
   a. Matter and energy
   b. Green plants
   c. Plant eaters
   d. Insect eaters
   e. Flesh eaters
   f. Man
2. Use a picture to illustrate each of the six basic groups listed above. Ask the following questions:
   a. Man
      (1) Does any animal eat man for food?
      (2) What does man eat?
      (3) Is man a dependent or an independent animal?
   b. Flesh eater (hawk)
      (1) What does this animal depend on for food?
      (2) How is he adapted for food getting?
      (3) What would happen if we destroyed all mice, rabbits, and other small animals?
   c. Insect eaters
      (1) What have you seen this animal eat?
      (2) Is there any variety of bird that is more harmful than helpful?
      (3) Suppose all the insect eaters were killed. Would this affect you? If so, why?
   d. Plant eater (deer)
      (1) What have you seen this animal eat?
      (2) Have you seen this animal in your area?
   e. Green plants
      (1) Does any living thing eat this? Name some.
      (2) What does this living thing depend on for food?
      (3) What would happen if you leveled a forest area with a bulldozer?
3. Go outside to a forest or field area. Mark off an area 3 feet long and 3 feet wide. List what you see in this area. Repeat in a cleared area such as a playground.
   a. Why are the two areas different?
   b. What factors caused the areas to be different?

Vocabulary: Environment, interrelationship, living community, herbivorous, carnivorous

Category: Science

Contributor: Sandra Burleson

Study of Plants in a Plant Community

Purpose: To show that plants live in communities and compete for survival and growing room.

Materials: Pencil, pad, and paper sack

Procedure:
1. Locate an area of plants and observe.
2. Talk about different plants and sizes of the plants in the area.
3. Establish different levels of heights in mature plants.
   a. Upper level - trees (above 30 ft.)
   b. Middle level - shrubs, bushes and small trees (3-30 ft.)
   c. Lower level - flowers, ferns, mosses, mushrooms, lichens, and molds (0-3 ft.)
4. Collect plants from the different levels.
5. Fill in chart:

Plants	Abundance		Where Growing		
	Few	Many	Open Sunlight	Partly Shaded	Dense Shade
Upper level (above 30 ft.)					
1.					
2.					
3.					
Middle Level (3-30 ft.)					
1.					
2.					
3.					
Lower level (0-3 ft.)					
1.					
2.					
3.					

6. Does the upper level affect the lower level?
7. What are some of man's uses for plants in each level?
8. Name some of the animals you would find in each level.

Category: Science

Plants and the water Cycle

Concept: Plants play a part in the water cycle.

Purpose:
1. To observe that living things are interdependent with one another and with their environment.
2. To observe what part a plant plays in the water cycle.

Materials: Large baggie or plastic sack.

Procedure:
1. Through the study of weather, students are aware of the water cycle. They should know that water evaporates from the land and water and accumulates to form clouds. They also know that plants need water for growth. As the plant gets water through its roots for food, what happens to it? With this question in mind, take students to school ground and find a sapling. Find a small branch and cover all or part of it with a large baggie or plastic sack. (Note: Also seal a plactic sack with no branch. This is the control sack.) Label the experiment so others will not disturb it.
2. Observe it a few days during a dry period to see if the leaves give off water.
3. Repeat the same experiment after a good rain. Make sure that the rain drops have evaporated from the leaves before placing the plastic bag over the branch. Compare the amount of water given off by the leaves during a dry period with that which was given off during a wet period.

Related Activities:
1. Take a stalk of celery and place in water with blue food coloring. Observe a few days and note how the colored water is carried by the tubes up to the leaves.
2. Find a tree that recently had a branch cut off and note how the water is coming out of the stump or stub.

Category: Science

Contributor: Carrye Martin

Water

Concept: All living things depend upon water.

Purpose: To help students realize the vital part water plays in the lives of all living things, and their responsibility to protect our water supply.

Materials: Hot plate, scales, two dishes, watermelon or tomato, dried prunes, dried raisins, dried apples, 3 quart jars with covers, water.

Procedure: Introducing the concept - Bring to class a container of water. Ask:

1. What do I have here?
2. Where does it come from?
3. How do you know you need water to stay alive?
4. How can you tell that the grass in your yard needs water?
5. What could we do to find out how much water there is in some living things? (One group might suggest using a watermelon or tomato.)
   a. Would we need to use a whole watermelon?
   b. About how much water do you think is in the melon?
   c. What can we do to find out?
      (1) Pupils may weigh a piece of watermelon before and after heating it.
      (2) Allow group to figure the amount of water.

Extending the concept - Ask:

1. Do you use foods each day that have had the water removed? Name some (frozen juice, condensed soup).
2. How could we restore water to dried foods? One group might investigate. Have on hand one-half cup of three kinds of dehydrated foods (prunes, raisins, apples), a measuring cup, three quart jars with covers, a scale, and water. Weigh one quart jar without cover. Record its weight. Weigh the half cup of each dry food separately in the jar. Deduct or subtract the weight of the jar to find out the actual weight of each kind of dried food. Record weight. Pour two cups of water into each jar. Put the prunes in one jar and the raisins and apples in the others. Cover the jars and let stand overnight. Ask: How can we find out how much water was used by each of the foods? (Pour off the water from each of the jars into the measuring cups separately.) Ask: How many ounces of water were absorbed by each? Have someone weigh each of the drained foods separately in an empty quart jar. Ask: What part of the dried food is solid matter (first weighing) and what part is water? (Dog food--dried and canned--is a good example.)

Category: Science

Water (continued)

Fixing the concept - How do you know life--your life--depends on water? Write a story titled "The Community with Little Water" or "The Desert Region Comes to Life."

Related Activities: Have children investigate at home with other foods (apples, potatoes) to find out how much water is in living things and report their findings. They use resource materials to find out how much water is in other living things: young leaves, roots, trees, and people. They observe what happens to plants when the soil is dry.

Resource: People and Their Environment, Teachers' Curriculum Guide to Conservation Education, Grades 4-5-6.

Category: Science

Contributor: Carrye Martin

Aquatics

Grade Level: 4th and 5th grades

Concept: Living things in the water need each other in order to survive.

Purpose: To teach the relationship of plant and animal life in water.

Materials: Microscopes, slides for examining specimens, lenses, art paper, collecting jars, nets, white enamel pans.

Procedure:
1. Bring small jars for collection of specimens and nets for securing these specimens.
2. Prepare for field trip by discussing things which will be observed.
3. Observe life around the ponds, lakes, or stream such as the plants, small animals and insects.
4. Collect specimens, such as microscopic life, insects, larvae, etc.
5. Use microscopes and hand lenses for identification of and comparison among specimens.

Vocabulary: Aquatics, microscopic, plankton, ecology, environmental metamorphosis, algae, communities, contribution.

Resources: Book on aquatic life such as Life of the Pond, Golden Press; reference books, filmstrips and films.

Category: Science

Conservation of Natural Resources

Grade Level: 5th grade

Purpose: To understand the meaning of the term "conservation." To understand the difference between conservation of renewable and nonrenewable resources. To study some methods commonly used in the conservation of natural resources. To understand that the conservation of soil, water, plants, and animals is closely interrelated, such as conserving the birds that eat the insects that destroy our trees. To develop positive conservation habits. To understand how important conservation is to the well being of the community and nation.

Procedure: Things to talk about -

1. What is conservation? Someone has said that conservation is the use, care, and protection of the land and other resources. Try making a definition of your own for conservation.
2. Renewable and nonrenewable resources. Soil, water, forest, grassland, and wildlife resources are renewable and therefore, can be used without destroying them. Iron, coal, oil, and many other minerals are nonrenewable.
3. Using land for things it can do without exhausting it - Some land is suited for growing crops. Some land is suited for pasture or range. Some land is suited for forest or woodland. Some land is suited for wildlife, recreation, or water supply.
4. Conserving water - Water that soaks into the soil aids in plant growth, furnishes water for wells, causes springs to flow, adds to clear streams. Water that runs off the land carries soil with it, causes floods, causes muddy streams, causes wells and springs to go dry.
5. Soil and water conservation practices that help to reduce runoff and soil loss - Contour plowing, strip cropping, terracing, small up stream gully-control dams, and grass waterways on land that is planted to crops. Planting grass, clover, and other thick-growing vegetation on land suited to pasture, but too steep for crops. Controlling grazing of pastureland and protecting it from fire. Planting trees on land that is suited for woodland. Protecting trees from fire, diseases, insects, and overgrazing. Cutting mature and diseased trees on established forests; leaving a good stand of healthy, growing trees. Protecting trees from grazing animals and overbrowsing of domestic livestock and wildlife such as deer and elk.

Category: Science

Conservation of Natural Resources (continued)

6. Conserving wildlife. Trees for wildlife, trees, bushes grass, and other natural vegetation make the best homes for many birds and animals. Clear streams and lakes are best for fish and waterfowl. Food for wildlife; seeds, plants, fruits, berries, insects, and animals found in nature furnish most of the food. Some food may be supplied to us during winter months. Protection of fish and wildlife by hunting and fishing laws, and wildlife refuges.
7. Soil, water, forests, and wildlife are interrelated. Soil and water are necessary for trees, grass, and wildlife. Trees, grass, and other plants help build and protect the soil, reduce floods, get more water in the ground, keep streams and lakes clear, and furnish food and shelter for fish and wildlife.
8. How wildlife helps trees, plants, and the soil.
9. How can city people conserve resources?

Related Activities:

1. Make field trips to farms where conservation farming is being practiced. Observe the different conservation practices and ask the farmer to exnlain them. Note the ways in which trees and other plants are used to protect the soil. Note the wildlife homes in shrubs and grass along field borders, stream banks, and roadsides.
2. Make field trips to game preserves, fish hatcheries, wildlife refuges, and tree nurseries.
3. Build a model farm for the display case in the hall and show proper water farming practices on the farm.
4. Make a trip to the community or state fair to observe conservation exhibits.
5. Plant trees or grass on eroding land in the school yard or at home.
6. Show motion pictures, film strips, and slides on conservation.
7. Organize a conservation club.
8. Make posters showing conservation practices.
9. Make a model showing the watershed in the community or nearby area.
10. Invite soil conservation officials in your area to speak to the class.
11. Learn the names of several trees and plants around the school yard.

Source: An Outline for Teaching Conservation in Elementary Schools, U.S. Department of Agriculture, Soil Conservation Service, PA-268, Page 6.

Category : Science

Appreciation of Nature

Purpose: To help the students to see, enjoy and then to note and analyze the impact that the changes in nature can have on people.

Procedure: A. On a warm, inviting day ask: If you could choose what would you be doing right now? Encourage the students to write down their choices. Then announce: You have just chosen your plans for the period (or the week).

B. Have a format of questions printed to serve as a guide for each student:

1. How would you like to spend this spring or fall day?
2. Name the place you would go (fishing, swimming, hunting, camping).
3. What natural resources would you be using?
4. What laws would protect you?
5. What laws protect the natural resources?
6. What might destroy your amusement (fishing, waters, wildlife) place?
7. How can you protect your amusement place for future use for you, for your children?
8. Does your activity harm anyone, cause to anyone beside yourself?

Review the papers and divide into recreational types. They may have: fishing, swimming, hiking, napping beneath the tree beside the brook, organized sports. Meet together to plan a presentation of what they have learned.

Student groups present their conclusions. A common thread as well as a variety of detail will run through the presentations.

Promote class discussions around the generalities presented.

C. Appreciation of Art: One way of looking at the environment is to see in terms of patterns. They may be natural or man-made. Identify these patterns: ovals, circles, squares, triangles, stars, spirals, crescents. How many can you identify on site?

D. Appreciation in Communications: The environment constantly sends messages to us. These signals may occur as sound (a train whistle in the distance tells us that a train is in the distance), sight (dark clouds warn us that a storm may be approaching), smell (evergreens announce their presence by emitting a fresh, piney odor), taste (salty water tells us to swim, not drink), and touch (hot pavement burning our feet tells us to put our shoes on).

Look around your site. What is it communicating to you and how? Which of your senses is picking up the greatest variety of signals? How do these signals make you feel?

Category: Science

Appreciation of Nature (continued)

"Read" your environment as if it were a book, describing itself to you. Notes: interaction and interdependence; continuity and change; evolution and adaptation. Similar things can be done in mathematics, science, and social studies. Subjects come alive when a real meaning is given.

Category: Science

Contributor: Carrye Martin

Trees

Purpose: To better understand the role trees have in maintaining life. To spend time in the forest using it as a laboratory for learning. To show appreciation of the dependence upon the forests by helping to protect them.

Procedure:

1. Tell how you feel here (class is standing within a wooded area). Why? Do other creatures have need for trees? Name some.
2. What kinds of trees are in this forest? Why do these species grow here?
3. How does the soil? the light? the climate? affect the growth of trees.
4. How do trees reproduce? How do they make food?
5. Name some enemies of the forest--(fire, man disease, natural forces such as wind, hail, snow, freezing, lightening).
6. What are the uses of forests?
   a. By planting, growing, cutting-sawing, jobs are made for men.
   b. The forests provide homes for animals.
   c. Furnishes food for wild animals and man.
   d. Recreational features.
   e. Means of controling erosion.
   f. Helps build new soil through decay and rebirth (example, the dead log in the forest).
7. Could man control the forests?
8. Why have forests always been important to people?
9. How were the pioneers dependent upon trees?
   a. Buildings - log lean-tos, one room log house, barns, shops, fences, cribs, meat houses, bridges, etc.
   b. To implement tools for work - barges, plows, ax handles, wagons, canoes, oars, ox yokes.
   c. Food - berries, nuts.
   d. Dyes.
   e. Basket weaving.
10. Name several ways man uses wood.
11. How does a tree finally become a part of the forest floor?
12. Step ten steps away. Find 3 objects. Describe them. How do they help or hinder forests?
13. Write a short paragraph telling what a tree might have experienced during its life.

Vocabulary: Laboratory, appreciation, species, adapt, reproduce, specific, forest floor.

Category: Science

Trees (continued)

Related Activities:

1. Use study area of Rocky Ravine Park and trees on campus. Learn common names of trees in park and on campus, write and spell.
2. How the trees manufacture own food.
3. Ways trees reproduce. How seeds travel.
4. Compare trees in the four seasons.
   a. Spring time watch for swelling of buds
   b. Force buds inside
   c. Observe how leaves are arranged in bud
   d. In summer watch for flowers change to fruit or seed
   e. In fall the change of colors.
5. Adopt a tree. Keep a record of changes during school year.
   a. Look for evidences of visitors to the tree (tracks)
   b. Examine insect life where found
   c. Introduce concept of measuring - steps, pace, using shadow measurments, do estimations, follow by using tapes or yard sticks to understand growth.
6. Use resource people
   a. Forest ranger - reforestation, diseases
   b. Ecology - water, air, visit small park stream
   c. Films of all sorts - library, U.S. Forest Service.
7. Do both oral and written work
   a. Use statements to react to - as those affecting the five senses (similar to what we did this week).
   b. Do one sentence discription of simple things in this study (example, shrill scream of the bluejay).
   c. Do creative writing, perhaps an imaginative story of the history of the adopted tree, of what it might have seen.
   d. Use bulletin board - "Did you know" idea.
   e. Make a collection of words related to these outdoor experiences.
8. Find songs, poems and games related to trees.
9. Gather seed, pods, grass and other materials for mosaic or for other arts and crafts.
10. Plan to plant a tree or shrub on campus.
11. Use film previewer and opaque projector to show trees in different seasons.
12. Make list of things group can do to protect trees.

Category: Science

The World of Insects

Purpose: This unit will attempt to tie together the unrelated knowledge that most children have about insects. The value of observation in learning about insects will be emphasized. Questions that are in the children's minds will be the subjects of research and discussion in an attempt to come to some conclusions.

Objectives:

1. To be able to identify as an insect any animal which has the following characteristics:
   a. Six jointed legs
   b. An exoskeleton
   c. Two kinds of eyes
   d. Usually two pairs of wings
   e. Head
   f. Thorax
   g. abdomen
   h. One pair of antennae
2. To be able to name and locate the above mentioned body parts.
3. To name and describe the life stages of insects
4. To describe the way in which social insects live.
5. To become aware of insect pests and problems they cause
6. To enrich and extend children's present interests in the world of insects.
7. To help children gain an appreciation of some of the scientific understandings applicable to the world of insects.
8. To help children use some of the skills of discovery and inquiry such as observation, experimentation, hypothesizing, recording data, and critical thinking.
9. To help children collect insects.

Materials: Possible insect signs, galls, leafminers, leaf rollers, paper nests, mud nests, ground nests, bark tunnels, insect nets, box sieve, sifting box, aspirator.

Procedures:

1. Planned classroom activities for introduction of lesson.
   a. What are insects?
   b. Man and insects--helpful or harmful?
   c. Insect development.
   d. The parts of insects.
2. Discovery and inquiry activities and the collecting of insects.
   a. Field trip or playground trip.
   b. Questions for students.
      (1) How do the observed insects move - Do they fly? Crawl? Hop?
      (2) Where can insects be seen - On trees? On rocks? On the upper or bottom sides of leaves?

Category: Science

The World of Insects (continued)

(3) When does there seem to be more movement by insects - In the morning hours? At noon? In the evening?
(4) What are some of the colors of the insects observed?
(5) Are the insect specimens larger or smaller than a penny? Longer or shorter than an inch?

c. Group collection of insects using nets, box sieve, sifting box and an aspirator.

3. Return to classroom -
a. Ask for observations from each group (free discussion).
b. Examine all specimens collected.
c. Ask questions presented in (Procedures - 2b).
d. Ask for written report or log of experiences.
e. Make an insect clue chart containing:
(1) Drawing of insect
(2) Size
(3) Color
(4) Hardness of shell
(5) How he moves
(6) Protection
(7) Where he lives
(8) Uses to man
(9) Body parts

Related Activities: See if the children can find 21 insect names hidden here -

W	O	S	H	P	A
M	A	T	I	N	G
U	N	Y	D	B	U
A	L	F	E	T	M
E	C	I	R	L	B
K	T	M	C	O	

Start with any letter and move in any direction up, down, across, or diagonally to spell an insect's name. No box may be skipped, but a letter may be repeated as often as needed. Some of the names are two-word names. In each of these cases, the box of the last letter of the first word touches the box of the first letter of the second word.

Answers: fly, ant, bee, cricket, budbug, butterfly, luna moth, flea, bumble bee, aphid, mantis, tumblebug, borer, termite, lice, mayfly, bee fly, firefly, deer fly, beetle, assassin bug.

Category: Science

Contributor: Gilbert Butler

Soils

Purpose:
1. To understand that soils contain both organic and mineral matter.
2. To compare soils in different places (woods and open fields.)
3. To understand why some soil is more fertile.
4. To see why dead plants are important to soil.

Materials: Two tin cans, matches, scale, pencil, and paper.

Procedure:
1. Collect small quantity dry soil in wooded area and weigh in tin can. Burn oil in can till all organic matter is destroyed. Weigh residue.
2. Do same with sample from open field.
3. Compare two soils.
4. Which soil is highest in organic matter?
5. Which soil is likely to be most fertile?

Evaluation:
1. Residue of soil from woods should weigh less than that of open field.
2. What are some organic materials found in the soil?

Category: Science

Contributor: Marg[illegible] Butler

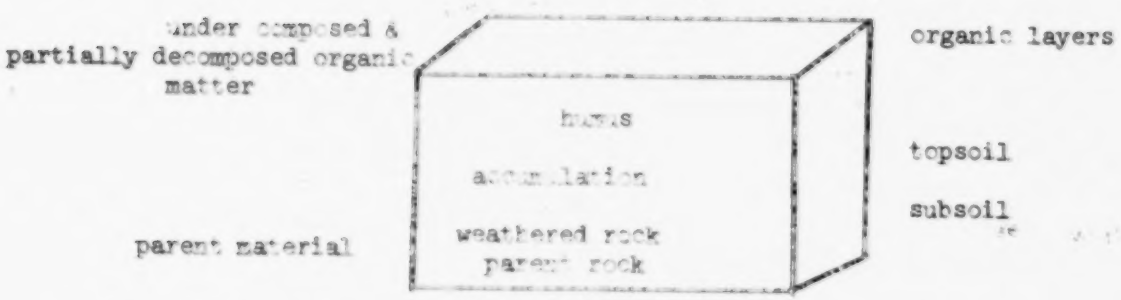
Soils

Concept: The composition of the soil varies from surface to rock bed.

Purpose: To show the different layers of the soil from the surface to the parent rock.

Materials: Shovel, soil profile chart.

Procedure: 1. Dig hole (1 ft. wide, 2 ft. long) from surface to parent rock.
2. Compare soil profile with following chart and identify each layer



Evaluation: Discussion - Depth from surface to parent rock affects type plants which can be grown. Have each student make profile chart.

Category: Science

Rocks - Simple Classifications

Grade Level: Grades 1 through 4

Concept: There are many different kinds of rocks

Purpose: 1. To investigate likenesses and differences in rocks, and to develop an appreciation of their aesthetic value.
2. To begin to develop the idea that it takes thousands of years to form rocks.
3. To build a foundation for the study of conservation of nonrenewable resources.

Materials: Magnifying glasses, several pieces of ceramic tile, several aluminum foil pie plates and water, several tin cans of water, heavy water glass of vinegar, varieties of rocks, labels for rock categories, several nails.

Procedure - Introducing the concept - The day before presenting this lesson invite the class to look for rocks and bring them to school the next day; (or take the children outside and let them collect rocks or pebbles from the school grounds). Suggest good places to look: along the seashore, the edge of a lake, the bottom of a little brook, your own backyard, a cut in a hillside made by highway construction. Begin the lesson by inviting the children to place their rocks on the tables in front of them.

1. How are they alike?
2. Are they all the same size?
3. How are they different?
4. Are they smooth, rough, or sharp?
5. What colors are they?
6. How do they smell?
7. Are they soft? Hard?

(It is not advisable to stress the names and scientific classifications for grades 1-4.

Developing the concept - Divide the class into small working groups for study. Give each group several varieties of rocks, a magnifying glass, a piece of ceramic tile for testing color, and an aluminum pie pan containing a small amount of water.

1. Have them examine rocks with magnifying glasses.
2. Test for color by rubbing each rock on the piece of tile. (Let them discover which side is best to use.)
3. Have them wash the rocks in water in a pie pan. (This washes the dust away and makes some smell different. (A slate rock will smell like mud.)

Invite the child who has a small smooth rock to bring it up to the observation table. Ask: What are little rocks called? (pebbles). Explain that a little pebble was once a part of a big rock. Ask the child where he found his pebble. Ask the class to guess how that little pebble got there. Tell the class that a pebble would have a long

Category: Science

Rocks - Simple Classifications (continued)

story to tell if it could talk.

1. Perhaps it was once a part of a high mountain top, or a rocky cliff along the shore, or a rocky island, or a wall in a deep cave.
2. Perhaps a tree grew in a crack in a big rock and broke it.
3. Perhaps water froze in a crack in a big rock and broke it.
4. Perhaps the water of a river rolled it over and made it smooth.
5. Perhaps the waves rolled it over and made it smooth.
6. Perhaps the wind polised it by blowing sand against it.
7. Perhaps a river carried it down from a mountain to the sea.
8. Perhaps it had a fast ride in a train or a truck in a load of gravel.

Suggest that they rub two stones with sharp edges together. Then try shaking them around in a tin can of water. They discover that making smooth pebbles out of little rough pieces of stone takes a very long time.

Extending the concept - Tell the children that some rocks make bubbles (lime content).

Resources: Show film "Rocks, Where They Come From."

Category: Science

Decaying Log or Stump - Comparative Study

Purpose:
1. To observe that living things are interdependent with one another and with their environment.
2. To observe that living things are affected by their environment.
3. To observe that living things capture matter from the environment and return it to the environment.

Procedure:
1. Discuss in the classroom the various plant seeds and how they are distributed. Have the class bring in samples. Interject in classroom discussion that some plants bear seeds only once while others bear seeds many times over their life cycle. Discuss what happens to the plants after they die.
2. Take the class to the nearest wooded area, locate logs in various stages of decay. Take note of the hanging log community as well as the ground floor dead log community. Do the same "detective work' on a tree stump.
3. On the field trip you would need hand lenses and containers to collect various samples of decaying matter. Have students observe the various stages of the growth from seedling to decaying tree matter being churned into the top soil. Take note of the consistency of the soil below the ground-floor decaying log or stump at various stages of disintegration. Bring out how the decayed matter enriches the soil. Take samples of the soil and compare the water holding quality of each.
4. Questions could be given to students to help them do "detective work" similar to the following ones -
   a. Of what kind of tree is this stump (Study the bark.)
   b. How was the tree cut? (Most stumps show that the tree was cut with a saw.)
   c. In what direction did the men face while cutting the tree?
   d. In what direction did the tree fall? (Look for the notch.)
   e. Was the tree dead or alive when it was cut? (Look for firm, hardwood at the outside of the stump.)
   f. How old was the tree when it was cut? (Count the annual rings.)
   g. What is the diameter of the stump. (Measure, or estimate carefully.)
   h. What is the stump circumference? (Measure, estimate, or calculate from the diameter.)
   i. About how long ago was the tree cut? (The condition of the stump is a guide in making this estimate.)
   j. In what years did the tree grow well? (After the tree's age has been determined, look for wide annual rings and calculate in what years they grew.)
   k. Is there any evidence that the tree was injured in any way while it was growing? (Look for incomplete annual rings.)

Category: Science

Decaying Log or Stump - Comparative Study (continued)

l. Why might the annual rings be close together in the center of a tree that grew in a forest? (Heavy shade would make the young tree grow slowly.)

m. Is there any evidence that the stump is the home of any living things now? (Look under the bark or in any holes in the wood for insects. Look for holes around the roots that might indicate entrances to the homes of small animals.)

Category: Science

Contributor: Laura Jane Wright

Comparison of Seeds

Purpose: Comparison of different types of seeds in a specified area.

Procedure:

1. Each child is given a certain amount of space in a wooded area, an open field, and at the edge of the forest.
2. Each child is given three sacks - each labeled for appropriate area.
3. In a given amount of time children are to find a variety of seeds from each area.
4. When children reassemble comparisons of seeds from each area are made.
5. If children are able, identifications can be made.

Category: Social Studies

Learning to be a Conservationist

Concept: People who care for and use resources wisely are conservationists.

Purpose: To develop understanding of the meaning of conservation and conservationists.

Materials: Newspaper, white cardboard, pins

Procedure: During Daily Theme: Bring the morning newspaper to school. Open it before the children. Ask:

1. What is this?
2. What is it for? (Daddy reads it to find out the news; mother reads the ads, pages; children read the comics.)
3. What do you do with it after you have read the news?
4. What are some things you could use it for after it has been read?
   A. Home: Shade for plants, to put in a kitten or puppy box, to wrap breakable things in packing, to soak up spilled water, etc.)
   B. School: Papier-mache, form paper pictures, spread finger paintings out to dry, protect tables when using clay, costumes for plays, etc.)

Developing the Concept: List some other things we use at school which are made of paper: books, writing paper, art paper, towels, tissues, napkins, straws, milk cartons, boxes, wrapping paper, labels, etc. Make a bulletin board display of paper products. Use things brought by the children. Say to the children: Paper comes from one of our seven natural resources. Discuss which are: soil, water, forests, minerals, wildlife, air, people. How is paper made? Trees are cut down, chipped up, and cooked until it becomes a soft mass. This pulp is dried out, rolled and made into sheets of paper. Then it is made into all kinds of paper products. When we use paper wisely we are using the product of one of our natural resources wisely. This is called conservation. People who save and use things carefully are called conservationists.

Ending the Concept: What are some other ways we can be conservationists at school? Make a chart listing suggestions given by the children, such as:

1. Be careful at the fountain and do not waste water.
2. Use only one paper towel at a time.
3. Take care of our books.
4. Don't waste writing paper.
5. Walk on sidewalks, not on the grass.
6. Use chalk, crayons, and paints carefully.

Category: Social Studies

Learning to be a Conservationist (continued)

Fixing the concept - How can we be conservationists at home? Give each child a round, white charboard disk about three inches in diameter. Have him write in large letters, "I am a Conservationist," inside the disk. He may then put any decorations he chooses around the edge. Pin each child's disk on to make a badge. Ask the children to wear their badges for three days, then report back to the class something they did to earn the title "Conservationist."

Teach the children the Conservation Pledge: "I give my pledge as an American to save and faithfully to defend from waste the natural resources of my country--its soil and minerals, its forests, waters, and wildlife."

Order Conservation Pledge cards from your local Soil Conservation Service. Give each child one to take home to his father, to read, sign, and keep in his wallet.

Category: Social Studies

Farm Animals

Grade Level: Primary

Concept: To learn life habits of farm animals.

Purpose: To promote an understanding of farm animals.

Procedures: Visit to a farm - (preliminary activities; cut out animal pictures, categorize farm animals, read stories and poems). Observation at farm - tall vs. short animals, long-haired vs. short-haired, four-legged vs. two-legged, footprints of animals, varied movements of animals, baby animals and different ways of reproduction (eggs, live young).

Vocabulary: Environment, habits, size, shape, domestic vs. farm, wild vs. farm, footprints, movements, reproduction, male, female.

Resource Materials: Farm, zoo, or Mathis Dairy; chicken or duck eggs (incubated and hatched in classroom); films and filmstrips "Life on the Farm" during various seasons.

Evaluation: Discussion - Questions and answers. How are the animals alike? i.e., food, air, water, homes, young, etc. Draw pictures or make papier-mache examples of tallest and shortest animals, fattest and thinest, fastest and slowest; long-haired and short-haired, make mural of farm, write an experience story of trip (either individually or in group according to grade level). Write original poems or verses about an animal. Discuss - How do farm animals help man? What does man do for these animals?

Related Activities: Dramatics - "Three Little Pigs," "Billy Goat Gruff."

Category: Social Studies

Contributor: Alma Barber

Money from Minerals

Concept: Man uses resources in his environment.

Purpose: To teach how we use materials in our environment for our needs and purposes. In this case, a need for copper, one of the minerals, as a material for the production of coins.

Procedure: Introducing the concept - On a "What is it?" bulletin board display a penny.

Developing the concept - Ask:

1. Of what is a penny made?
2. When is it made?
3. Where is it made?
4. How is it made?
5. How is it designed?
6. Why do you think Abe Lincoln is on a penny?
7. Why are these words "In God We Trust" engraved on a penny?
8. Why do people need coins?

Extending the concept - During the lesson pupils have been asked to observe pennies. They have been asked to inquire about sales tax, savings and means of exchange. Ask pupils to make a list of items their parents could exchange for a penny when the parents were the pupils' ages. Ask:

1. Who has or has seen a World War II penny?
2. Is it different?
3. Why?
4. Who collects pennies?
5. Why is copper used in the sandwich quarter?

Pupils consider the importance of material used for exchange. They realize its limited supply. Some management of money is important for individuals or groups. Plan, with pupils a project involving money. Make a newspaper to sell. (A savings account is a way to earn money). Do you know pennies provide recreation for some people? (coin collecting).

Category: Social Studies

Fuels - Affect on Economy

Grade Level: Grades 10-12

Concept: Nations develop economic systems in relation to the availability of resources.

Purpose: To investigate the importance of resources used for fuel in our economy.

Materials: For this lesson use:

1. Chart III (see "Procedure - Introducing the concept) which shows the close relationship between our economic growth and the use of our sources of energy (1900-1960).
2. Chart V, which shows sources of energy we have used since 1900 and illustrates how each has gained in relative importance over the others.
3. Have a United States map which shows the location of deposits of coal, oil, etc.
4. Place on a bulletin board news items relating to atomic energy and other new developments in the area of energy production and use.

Procedure: Introducing the concept - Several weeks in advance, write to the American Petroleum Institute, 1271 Avenue of the Americas, New York, New York 10020, and ask for a copy of the study manual Energy and Economic Growth and the six wall charts which accompany it. These will be sent as a service to the teacher.

Developing the concept - Have a student exhibit chart III and explain it. Ask:

1. How have the fuels (inanimate energy) found in the United States been used to achieve greater economic growth?
2. What are some of the advantages in the use of inanimate energy over human energy?
3. Where are the major sources of energy located in the United States (coal, oil, major hydropower projects such as TVA, etc.)?
4. At what rate are these sources of energy being used?
5. How are these sources to be replaced?
6. How long does it take for coal to be replaced?
7. What industries developed in the United States are best adapted to the use of coal, water power, oil and gas.
8. What inanimate materials are now under experimentation in order to make the use of their energy for future industry practical and to further U.S. economic growth? Where are they found?

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